Studies on organ procurement for transplantation

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Summary and Conclusions

This thesis is composed of a number of articles, that have organ donors and organ procurement for transplantation as a common subject. In view of a persistent shortage of organs for transplantation an attempt has been made to give better indications for the usability of cadaveric donors and donor organs. In addition a model for an effective organ procurement in general hospitals is presented.

Chapter I consists of two studies on the use of paediatric cadaver kidneys for transplantation. In the first article the results of transplantation of paediatric kidneys in adult recipients are studied in the material of the Groningen transplant centre. For the second article, with a comparable design, data of the Eurotransplant organ exchange organisation are used. In spite of several unfavourable statements concerning the use of paediatric kidneys for transplantation, such as a suspected inadequate nephron mass, reports of a high technical failure and ATN rate, frequent vascular and urological complications and a possible poor graft survival, it is determined in both studies that paediatric donor age has no negative influence on patient and graft survival, nor on the postoperative renal function. The use of paediatric kidneys for transplantation is recommended and the application of a lower age limit for cadaveric donors is advised against. En-bloc grafting of paediatric kidneys is demonstrated to have no beneficial effects.

In chapter II another study of Eurotransplant data is presented, in which the usability for transplantation of kidneys from elderly cadaveric donors is examined. Despite several reports of a decrease in graft survival with progressing donor age the results of transplantation of these kidneys prove to be satisfactory. Also no adverse effect of the use of kidneys from donors over 50 years of age on graft function, measured by creatinine clearance, can be demonstrated. It is recommended to change the upper age limit for cadaveric donors from 50, as it is employed in many transplant centres, to 60 years of age.

The use of kidneys from donors, with a permanent circulatory arrest prior to the nephrectomy, is discussed in chapter III. Although the immediate postoperative function of non heart beating donor kidneys is not as favourable as in a control group of heart beating donor kidneys, graft and patient survival and the ultimate graft function, measured as creatinine clearance, are not affected. Especially when an in situ preservation technique is applied and the ischaemically damaged

kidneys are afterwards preserved by continuous pulsatile perfusion, good transplantation results can be obtained and non heart beating donor kidneys can therefore be an important source of cadaveric kidneys for transplantation. The data for this study have been collected in Groningen as well as in several other European transplant centres.

In the first three chapters of this thesis three different possibilities are offered to increase the number of donor kidneys, without a negative effect on the transplantation results.

Chapter IV deals with the possibility of transfer of infectious agents with allografts. Subsequent contraindications for organ donation are discussed. Victims of drowning, patients who have been ventilated mechanically for more than a week and patients with severe burns are high risk organ donors. The investigations to rule out the existence of transmissible disease in organ donors are presented, such as analysis of the case history of a potential organ donor, autopsy and blood and urine cultures.

The criteria for the selection of organ donors are discussed in chapter V. These are:

- Donor age under 60-65 years
- No primary disease of the donor organs.
- No evidence of neoplasms, other than primary (non-metastasizing) central nervous system tumours.
- No systemic signs of infection or evidence of sepsis.
- No preexisting hypertension requiring medication (kidney donation).
- No insuline dependent diabetes mellitus (kidney and pancreas donation).

The principles of donor management are described, together with the surgical techniques of the donor nephrectomy, hepatectomy and pancreatectomy, as well as the possibility of multiple organ harvesting. Special attention is paid to an en-bloc donor nephrectomy technique and the in situ preservation of kidneys, with the use of an intra-aortic double-balloon-triple-lumen (DBTL) catheter. In addition this chapter contains a paragraph on renal preservation, in which the cold storage technique as well as the continuous pulsatile perfusion method are discussed.

Finally in chapter VI the organisational aspects of organ procurement are discussed, in the light of the situation in the Netherlands. A model for an intensified regional organ procurement is displayed, in which a transplant coordinator plays a prominent part.

The author hopes that these publications contribute to the reduction of the shortage of organs for transplantation, which still is a hindrance for the execution of an effective treatment of patients with end-stage organ failure in many areas.